

Claims:

What is claimed is:

1. A polymeric porous membrane comprising two or more additives, said porous
5 membrane shows excellent combination of high water flux and solute rejection.
2. The porous membrane as claimed in claim 1, wherein porous membrane thickness
varies in the range of 8.5 to 15 mil.
3. The porous membrane as claimed in claim 1, wherein the water flux at 0.5 bar
varies in the range 22 to 370 ltm⁻²h⁻¹.
- 10 4. The porous membrane as claimed in claim 1, wherein the water flux at 1 bar varies
in the range 47 to 1120 ltm⁻²h⁻¹.
5. The porous membrane as claimed in claim 1 wherein the BSA rejection varies in
the range of 80 to 100 %.
6. The porous membrane as claimed in claim 1, wherein additives are selected from a
15 group comprising organic acids, inorganic salts, and viscosity enhancing agent.
7. The porous membrane as claimed in claim 6, wherein the additive organic acid is
selected from a group comprising tartaric acid, fumaric acid, maleic acid, malonic
acid, malic acid, citric acid, lactic acid, polylactic acid, polyacrylic acid
polystyrene sulfonic acid, their partial or total alkali or alkaline earth metal salts, or
20 any other acid containing two or more carboxyl or sulfonic acid groups.
8. The porous membrane as claimed in claim 6, wherein inorganic salts are selected
from a group comprising halides, and nitrates of Gr. I (A/B), II (A/B) elements of
periodic table, and metals Fe, Al, Co, Ru, Zn, Cd, and Hg.
9. The porous membrane as claimed in claim 6, wherein concentration of inorganic
25 salt in the dope solution is ranging between 0.1-15% (w/w).
10. The porous membrane as claimed in claim 6, wherein viscosity enhancing agent is
selected from a group comprising glycerol, water, poly vinyl pyrrolidone,
polyethylene glycol, and polyethylene oxide.
11. The porous membrane as claimed in claim 6, concentration of viscosity enhancing
30 agents in dope solution is ranging between 0.1-30% (w/w).

12. The porous membrane as claimed in claim 1, the polymer is selected from a group comprising polyacrylonitrile, polysulfone, and polyethersulfone.
13. The porous membrane as claimed in claim 1, wherein the membrane can be prepared in both flat sheet form and hollow fiber form.
- 5 14. The porous membrane as claimed in claim 13, wherein the flat sheet membrane is prepared on a moving suitably porous backing.
15. The porous membrane as claimed in claim 13, wherein the hollow fiber form is prepared by passing dope solution through a spinneret followed by gelation and precipitation in non-solvent.
- 10 16. The porous membrane as claimed in claim 1, wherein the membrane formed is ultra/micro-filtration in nature.
17. A process for the preparation of a porous membrane of polymers by combining two or more additives, wherein said membrane, useful for ultrafiltration, shows excellent combination of high water flux and solute rejection, said method comprising steps of:
- 15 a. adding two or more additives in organic solvent(s) to obtain a dope solution,
b. stirring the dope solution,
c. adding polymer slowly into the dope solution,
d. stirring the dope solution,
20 e. degassing the dope solution,
f. removing the undissolved particles to obtain homogeneous dope solution,
g. casting the homogeneous dope solution,
h. precipitating the cast in a non-solvent,
i. washing the precipitated cast in running water, and
25 j. obtaining the porous membrane having excellent combination of high water flux and solute rejection.
18. A process as claimed in claim 17, wherein organic solvent is selected from a group comprising N, N-dimethyl formamide (DMF), N, N-dimethyl acetamide (DMAc), N-methyl pyrrolidone (NMP), and dimethyl sulfoxide (DMSO).

19. A process as claimed in claim 17, wherein the concentration of organic acid in dope solution is ranging between 0.1 to 35% (w/w).
20. A process as claimed in claim 17, wherein organic solvent is a mixture of two or more solvents in the ratio ranging between 1:99 to 99:1.
- 5 21. A process as claimed in claim 17, wherein additives are selected from a group comprising organic acids, inorganic salts, and viscosity enhancing agent.
22. A process as claimed in claim 21, wherein the additive organic acid is selected from a group comprising tartaric acid, fumaric acid, maleic acid, malonic acid, malic acid, citric acid, lactic acid, polylactic acid, polyacrylic acid, polystyrene sulfonic acid, their partial or total alkali or alkaline earth metal salts, or any other acid containing two or more carboxyl or sulfonic acid groups.
- 10 23. A process as claimed in claim 21, wherein inorganic salts are selected from a group comprising halides, and nitrates of Gr. I (A/B), II (A/B) elements of periodic table, and metals Fe, Al, Co, Ru, Zn, Cd, and Hg.
- 15 24. A process as claimed in claim 21, wherein concentration of inorganic salt in the dope solution is ranging between 0.1-15% (w/w).
25. A process as claimed in claim 21, wherein viscosity enhancing agent is selected from a group comprising glycerol, water, poly vinyl pyrrolidone, polyethylene glycol, and polyethylene oxide.
- 20 26. A process as claimed in claim 21, concentration of viscosity enhancing agents in dope solution is ranging between 0.1-30% (w/w).
27. A process as claimed in claim 17, the polymer is selected from a group comprising polyacrylonitrile, polysulfone, and polyethersulfone.
28. A process as claimed in claim 17, wherein the polymer is polyacrylonitrile.
- 25 29. A process as claimed in claim 17, wherein the concentration of polymer is ranging between 5-30% (w/w).
30. A process as claimed in claim 17, wherein the degassing of dope solution is for the time duration ranging between 5-25 minutes.
31. A process as claimed in claim 17, wherein the undissolved particles are removed by centrifugation or filtration.
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32. A process as claimed in claim 17, wherein non-solvent is selected from a group comprising water, acetone, and alcohol.

33. A process as claimed in claim 17, wherein the non-solvent is water.

5 34. A process as claimed in claim 32, wherein alcohol is selected from a group comprising methanol, ethanol, and iso propanol, or a mixture thereof.

35. A process as claimed in claim 17, wherein non-solvent is miscible with both organic solvent and the additives.

36. A process as claimed in claim 17, wherein the process is carried out at temperature ranging between 4-50⁰C.

10 37. A process as claimed in claim 17, wherein the process is carried out at temperature ranging between 10-30⁰C.

38. A process as claimed I claim 17, wherein the membrane can be prepared in both flat sheet form and hollow fiber form.

15 39. A process as claimed in claim 17, wherein the membrane formed is ultra/micro-filtration in nature.

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